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ABSTRACT

The distinction between core and peripheral grammar made in government-binding theory sheds light on some questions concerning the acquisition of the inflectional morphology of different languages. The schedule for acquisition of the inflectional system may be determined not by the learning of particular affixes but by whether inflection is a core or peripheral property of the grammar being acquired. There is a striking difference between languages concerning this property. This would explain the early acquisition of the morpheme "-ing" in English but the relatively late acquisition of other inflectional morphemes in the somewhat impoverished inflectional system of English. It is the degree of deviation from the core grammar rather than the intuitive complexity of the data that accounts for the relative ease or difficulty of acquisition. The theory would also explain the phenomenon, occurring in languages with rich inflectional systems, of children's avoidance of zero morpheme affixation. Evidence of these processes also appears in such diverse languages as Polish, Italian, Serbo-Croatian, Russian, Hebrew, and American Sign Language. This view of markedness as peripheral in one language and part of the core grammar in another is unusual and should be further tested in other languages. (MSE)

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Core and Peripheral Grammar and the Acquisition of Inflection

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Within Government-Binding Theory a distinction is made between core and peripheral grammar. The core grammar of a particular language is the set of grammatical properties which is determined by fixing the parameters of UG in one or another of the permitted configurations. Outside of core grammar is the set of "peripheral" of "marked" properties of the language. The periphery includes, among other things, exceptions or "relaxations" of the settings of core grammar. So conceived, the core/periphery distinction has rather direct implications for actual grammatical development. It leads us to expect that the marked or peripheral aspects of a particular grammatical phenomenon will be more difficult to acquire than those aspects of the phenomenon which are related to core grammar. Last year at this conference I proposed that core/periphery disinction was useful in explaining various aspects of the acquisition of complex sentences. In my talk today I would like to suggest that this distinction also sheds light on some questions concerning the acquisition of inflectional morphology in different

languages.

The first question I would like to address is why is an impoverished morphological system like that of English so difficult to acquire? It is well-known that English speaking children achieve productive control of verbal inflection relatively late in the acquisition process. Brown (1973), in his study of the 14 grammatical morphemes, ranks the the '3rd person regular' (-s) as 9.66 in order of acquisition. The mean age of the three children studied by Brown at the point at which they had productive control of this verbal inflection is 2;9. Similarly, Brown ranks acquisition of the regular past tense ed morpheme as 9.00, only slightly earlier. This latter observation suggests that the child's difficulty with the 3rd person regular morpheme is not a function of whatever grammatical complexity is inherent in agreement rules since the English past tense morpheme does not agree with the subject in any sense, though it is also a late acquisition. Rather, it thus seems that the English speaking child has difficulty with verbal inflection in general. This is, of course of the salient properties of early language which contributes to its "telegraphic" quality, as noted by Brown & others. There is one apparent exception to this generalization; the present progressive morpheme -ing, which Brown ranks as the first of the 14 morphemes to be acquired. I will return to this later.

This late mastery of English inflection is particularly surprising in light of recent research which shows that children acquiring much more richly inflected languages learn the inflectional system of these languages at a strikingly early age

and with relatively few errors. Consider, for example, the child acquiring Polish. Weist & Witkowska-Stadnik (1985) report that the children they studied had productive control of the nominal case system, which contains 7 cases, and subject-verb agreement for person, number and gender by age 1;9. Similarly, in my own study of the acquisition of agreement rules by Italian speaking children (Hyams, 1984), I found that they had mastered the present tense verbal paradigm by roughly age 2;0. In Italian the verb is inflected to agree with the subject in person and number. One of the present tense paradigm is given in (1).

(1) parl- (to speak)

	singular	plural
1p	-o	-iamo
2p	-i	-ate
3p	-a	-anno

If we compare the matrix in (1) with that in (2), the present tense paradigm for English, it seems clear that the English speaking child's problem does not lie in the learning of particular affixes. Common sense (and any learning theory) tells us that it should be more difficult to learn the 6 Italian affixes than the single English one.

(2) speak

	singular	plural
1p	Ø	Ø
2p	Ø	Ø
3p	-s	Ø

What I would like to suggest is that the rate at which a child learns the inflectional system of his language is not a function of the intuitive complexity of the system, but rather depends in large measure on how the system interacts with principles of UG, or more to the point, whether the inflectional system is a core or peripheral property of the language being acquired.

Before turning to the acquisition facts, however, let us consider the structure of the systems to be acquired. Notice that there is a striking difference between English on the one hand, and languages like Italian on the other. In English, a verbal stem may surface without an overt affix. Thus, speak is a well-formed word in the language. In Italian, in contrast, the verbal stem requires an overt affix; the form parl- is simply ill-formed. Let us express the different morphological requirements of the two languages as a parameter, informally stated in (3).

(3) The Stem Parameter

A verbal stem does/does not constitute a well-formed word

Since languages may vary in the manner suggested in (3) this

parameter must be fixed by the child at the value which is appropriate for the particular language he is exposed to.

Let us turn now to the acquisition facts noted earlier. Young English speaking children typically produce uninflected verb forms, as illustrated in (4).

(4) Mommy throw it away
Man sit down
Kathryn want build another house
Gia ride bike

(from Bloom, Lightbown & Hood, 1975)

These sentences violate a syntactic rule of agreement, which requires that the verb agree with a 3rd person singular subject. However, given the parameter in (3), these productions are well-formed at the morphological level, since in English a verbal stem constitues a well-formed word. In languages like Italian, in contrast, the verb must surface with an overt affix. Children acquiring Italian and similar languages, rarely, if ever, produce uninflected verbs. Thus, like English speaking children, their verbs are well-formed at the appropriate grammatical level. This suggests that language particular conditions on word structure are learned at a very early age, or more to the point, that the parameter in (3) is set very early on.

With regard to the learning of particular affixes, it seems reasonable to suppose that their rate of acquisition will depend in part on the choice which the child makes with respect to the Stem Parameter. Once the Italian speaking child determines that stems require overt affixes in his language, he will need to learn the affixes in order to satisfy this requirement. So the

learning of particular affixes is triggered by the parameter setting. The English speaking child sets the Stem Parameter at the opposite value; a verbal stem constitutes a well-formed word. Thus, he need not learn any inflectional morphemes in order to satisfy the well-formedness condition in his language. Obviously, each child will set this parameter based on the linguistic input he receives. The English speaking child hears that the verb is largely invariant in form, while the Italian child receives a much more variable input.

One desirable result of the above account is that there is no sense in which the English speaking child is grammatically "delayed" relative to his Italian or Polish speaking cohorts. The difference in linguistic behavior exhibited by the two populations is strictly an effect of different settings along a particular parameter. In each case, the child's language conforms to the specifications of the particular grammar he has developed. Moreover, the learning of particular affixes is no more or less difficult for the English speaking children than for the Italian child. Rather, the English speaking child does not learn inflectional morphemes at this stage because this acquisition has not been triggered by his parameter setting. He is operating under the hypothesis that English is a language with no verbal morphology.

Assuming that this account is on the right track, what explains the precocious appearance of the progressive _-ing_ morpheme, which as noted earlier, is the first of Brown's 14 grammatical morphemes to be acquired. Moreover, what do we say

about the eventual acquisition of 3rd person regular and past tense morphemes? How are they acquired -- and why?

I turn first to the progressive morpheme. Although sentences of the sort in (5) are frequent in early language, during a time when children are not using the present or past tense affixes, there is some reason to suspect that the child does not initially analyze the progressive form of the verb as consisting of a verbal stem and affix.

(5) No the sun shining
He eating ice cream
You waking me up
Oh, no raining

(From Bellugi, 1967)

First, as exemplified by the examples in (5), the progressive verb is first used without the auxiliary be, suggesting that -ing is not a separate morpheme which is selected by the auxiliary, as is the case in the adult grammar. Instead, it may be that the child learns each progressive form as a distinct verb so that hit and hitting, for example, actual represent two distinct lexical entries. This hypothesis is supported by a second fact, noted by Cazden (1968) that unlike the verbal affixes -s and -ed , -ing fails to overgeneralize. Thus, while errors such as those in (6) are common, forms such as those in (7) are virtually unattested in the acquisition data. [1]

(6) taked
tooks
gots
maked

(7) *tooking

*wenting

If we credit the child with actually knowing the progressive morpheme only at the point at which it co-occurs with the auxiliary be, then its acquisition occurs significantly later. According to Brown (1973) the auxiliary be is the last of the 14 grammatical morphemes to be acquired.

Let me now turn to the question of how the child eventually acquires the verbal inflections of English. Here the core/periphery distinction becomes relevant. Recall that "core" properties of grammar are those which are determined by fixing the parameters of UG , while "marked" or "peripheral" processes are those which require a "relaxation" of particular parameter settings. We saw that the acquisition of the Italian affixes is triggered by a particular setting along the Stem Parameter, one which requires that verbal stems bear affixes. Thus, on this account, inflectional morphology in a language like Italian represents a "core" property of the language insofar as it is closely related to (i.e. triggered by) the setting of a particular parameter. In English, in contrast, the Stem Parameter specifies that verbs are uninflected and so the acqusition of the 3rd person, past tense, and progressive morphemes actually represent a "departure" from the core grammar of English. Assuming that the peripheral aspects of a grammatical subsystem take longer to sort out than the core properties, because they either require more exposure to data or more computation, we have an explanation for why the English verbal morphology is acquired later that the inflectional paradigms in more richly inflected languages. Thus, on this account it is the markedness

of rule systems, that is, the degree of deviation from the core grammer, rather than the intuitive complexity of the data which is responsible for the relative ease or difficulty of acquisition.

The analysis which I am proposing allows us to explain another curious acquisition phenomenon, namely, why children acquiring languages with relatively rich inflectional systems tend to avoid Ø affixation, even where the latter would be correct in the adult language. Slobin (1973) observes that children acquiring Russian mark all accusative nouns with the feminine accusative -u affix although in the adult language, masculine non-human and neuter accusative nouns bear a 0 affix. Similarly, he reports that Gvozdev's (1961) Russian child used the affix -ov for all plural genitive nouns, replacing the feminine plural genitive Ø affix. He further notes that the replacement of Ø affixes also occurs in the acquisition of Serbo-Croatian. Slobin expresses the generalization as in (8).

(8) There is a preference not to mark a semantic category by Ø (zero morpheme). If a category is sometimes marked by Ø and sometimes by an overt phonological form, the latter will, at some stage, also replace the Ø. (Slobin, 1973; p. 202)

The Stem Parameter formulated in (3) provides a straightforward explanation for this phenomenon. Russian, and the other languages noted by Slobin, are richly inflected languages which typically do not allow bare stems; the obvious exceptions being the cases of Ø affixation like those discussed by Slobin. Thus, we may assume that Russian adopts the [-bare stem] option along the Stem Parameter. Having determined that bare stems are ill-formed in his language, the Russian-speaking

child replaces all zero morphemes with overt affixes. Those instances in which the noun is indeed uninflected represent a marked extension of the Russian system, a relaxation of the Stem Parameter, and are hence a later acquisition.

A closely related phenomenon, which can also be partially explained by the Stem Parameter account, is what Slobin (1973) refers to as "inflectional imperialism." Slobin notes that in acquiring a set of affixes for a particular grammatical class children will very often first learn only one member of the set and overgeneralize it to all words in the class. A typically example is the child who is acquiring a language with a case system who first learn the feminine form of the nominative and use it with masculine and neuter nouns as well as feminine ones. A concrete example is offered by Levy (1980), who observes that the Hebrew speaking child first marks plurality on nouns by the invariant addition of the masculine suffix -im, and only later distinguishes the feminine nouns by the affix -ot.

Although it is unclear why the child chooses a particular affix to begin with, for example, why the Hebrew-speaking child first chooses the -im affix, the account proposed here does provide an explanation for why the first affix acquired is overgeneralized. The alternative would be to leave the other forms (for which the appropriate affixes have not yet been learned) without any affix whatsoever. This latter option is excluded by the requirement that the stem bear some affix.

The acquisition of American Sign Language also exhibits properties which can be partially explained by this parameterized

approach to the acquisition of inflection. Because ASL exhibits subject verb agreement, marked by the movement of the verb in relation to specific points in space, we might expect its acquisition to pattern like that of other inflected languages, for example, Italian. However, Lillo-Martin (1985) reports that children acquiring ASL are extraordinarily late in learning subject-verb agreement. For non-present referents, that is, instances in which the subject of the sentence is designated by a point in signing space, the children did not achieve productive control of agreement until 5-6 years, while agreement with present referents was typically achieved around 2 1/2 or 3 years. Thus, ASL speaking children pattern like English speaking children. A possible explanation presents itself when we consider the nature of the input data in ASL. Although ASL has a richer system of verbal morphology than English, since all grammatical persons are marked, this is true only for a subset of the verbs in the language. There is an entire class of verbs in the language which do not inflect to agree with the subject. It seems to be the case, then, that when the input data are inconsistent in this manner, the child assumes that bare verbal stems are well-formed words and sets the Stem Parameter accordingly. On this hypothesis, the acquisition of inflection in ASL is late because, as in English, the verbal inflection is a marked or peripheral phenomenon. [2]

Before concluding let me turn briefly to the issue of markedness. The view of syntactic markedness adopted in this paper is somewhat unusual in that I am proposing that a particular phenomenon may be marked or peripheral in one

language, but part of the core grammar of the next language. The claim that inflection represents a marked or peripheral aspect of the grammar of English receives some independent support from cross-linguistic studies of agrammatic aphasics, in particular the work of Y. Grodzinsky (1984). Agrammatic patients, a subclass of Broca's aphasics, are typically characterized as having "telegraphic" speech. Like young children, their speech is marked by an absence of grammatical formatives, including inflections. Interestingly, Grodzinsky notes that of the languages he studied, the omission of inflectional morphology only occurs with English speaking aphasics. Speakers of Italian, Russian and Hebrew, in contrast, never drop inflectional affixes - though the affixes frequently fail to agree appropriately. Thus, while the Italian aphasic might utter sentences of the sort given in (9a,b), where the verb bears some inflection which fails to appropriately agree with the subject, he will never make the error of producing a bare verbal stem, (as in (9c)), as the English speaking agrammatic typically does.

(9) a. Ragazza parlo.
(girl speak -1st person singular affix)
b. Ragazza parlare.
(girl speak-infinitive affix)
c. *Ragazza parl
(Girl speak -stem) [3]

This difference between aphasic speakers of English on the one hand and speakers of languages like Italian, Russian, and Hebrew, on the other, is exactly what we would expect under the assumption that marked or peripheral grammatical processes are

somehow more vulnerable or easily disrupted in the event of neurological damage, as originally proposed by Jakobson (1968). The inflectional requirements of the other languages, however, which are more closely connected to core grammar, appear to be more stable. With respect to ASL, the analysis presented earlier leads us to expect that ASL agrammatic aphasics will pattern like English speaking aphasics in omitting verbal inflection. I know of only one relevant case, discussed in Bellugi (1983), and this aphasic patient did indeed drop the agreement morphology, as predicted.

Let me conclude by saying that the analysis proposed here obviously needs to be tested against the acquisition data of other languages - especially since morphological systems vary a fair amount from language to language.[4] However, irrespective of the ultimate correctness of the specific parameter proposed here, I hope to have made the more general methodological point that it is not necessarily the intuitive complexity of the data which makes the acquisition of a particular construction or grammatical phenomenon difficult, but rather the complexity of rule systems, where we understand "complexity" to mean degree of deviation from core grammar.

Notes

* I would like to thank Osvaldo Jaeggli and Chuck Cairns for helpful comments on many of the issues discussed in this paper. I would also like to express my gratitude to an anonymous reveiwer of my dissertation (Hyams, 1983), for first suggesting the idea of a Stem Parameter to me. Notes will be marked in the text by a number in parentheses, eg. [1].

[1] It is also the case, as noted in Brown (1973), that children do not overgeneralize -ing to stative verbs. This fact has led many researchers to assume that very young children understand the stative/process distinction and the semantic restriction on -ing. While it is possible that children do know the process/stative distinction very early on, (See Cziko (1986) for impressive cross-linguistic evidence to this effect.), it does not follow that they analyze the progressive verb form as bimorphemic. An alternative explanation, and one which would account for the absence of overgeneralization, is that the child initially learns each progressive form as a separate unanalyzed verb and hence uses only those forms that he has heard in the input language, that is, non-stative verbs.

[2] It is interesting to note that the later emergence of inflection in ASL argues against a functionalist approach to acquisition. While one might propose that English inflection is acquired late because it is redundant given the requirement of an overt subject, this is not the case in ASL. ASL allows null subjects with those verbs which take agreement morphology and children acquiring ASL do omit subjects despite the absence of agreement in their own language. For discussion of the acquisition of null pronouns and agreement in ASL, see Lill-Martin (1986).

[3] These are hypothetical examples of the phenomenon discussed in Grodzinsky, 1984. The actual Italian examples he cites involve complications which are irrelevant to the present discussion.)

[4] As a case in point, D. Slobin (p.c.) informs me that in Turkish, a highly inflected language, the verb does, on rare occasion, surface as a bare stem, for example in the simple imperative form, eg. ver 'give'. Slobin notes further that children do not put affixes on the imperative verb, as would be predicted by the account proposed here. Rather, Turkish children make strikingly few errors of any sort in learning a complex inflectional system, while still using the (marked) imperative in its correct bare stem form.

There are two possible solutions to this problem. The first concerns the relative order of acquisition of the inflectional verbal paradigms and the bare stem imperative form. Atso-Koc and Slobin (1985) note that "much of the verbal paradigm in mastered by 24 months of age or earlier. By this age Turkish children inflect ...the verb for tense-aspect (past result, ongoing process, intention), person, negation and interrogation." (p. 845). They also report, in a discussion of the acquisition of 'politeness norms,' that "Request forms expressing degrees of politeness are acquired in a progressive sequence between the ages of 2 and 4 (p. 869)," the first of these forms being the bare infinitive form noted above. Thus, the bare stem imperative form appears to be acquired at a point at which the child has already mastered many of the other inflected verb forms. If this is the case, the later development of the imperative may be due

to its marked status.

If it should turn out, upon closer inspection of the Turkish data, that the imperative is not late relative to the other verb forms, then the analysis proposed in this paper must be modified to incorporate situations like that which exist in Turkish. See Hyams (in preparation) for further discussion of this issue.

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